



Management of Canola N Fertilization in Virginia

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INTRODUCTION

Previous research, during late 1990 and early 2000s indicated that N needs of canola in Virginia are about 100 pounds/acre. These studies were conducted with older germplasm which was not entirely adapted to Virginia's agro-climatic conditions. The current studies were conducted to substantiate previous results while using recently developed canola variety named "VIRGINIA". The importance of N fertilizer in crop production can't be over-emphasized. In addition to being one of the six most important nutrients for plant growth, information about N use in crop production is also important due to cost and environmental-pollution issues. We report results of two experiments conducted in Virginia.

Experiment - 1

Cultivar : Virginia
Locations : Two (Orange and Petersburg)
Treatments : Three N rates (50, 100, and 150 pounds/acre
Three application times (All in fall, all in spring;
half in fall and
half in spring
Design : RCBD, 4 replications, factorial treatments
Season : 2008-09

Seed Yields (Pounds/acre)*	Seed Yield (Orange)	Seed Yield (Petersburg)
50 pounds/acre	2095 b	2220 a
100 pounds per acre	2099 b	2326 a
150 pounds per acre	2421 a	2038 a

N Application Time	Seed Yield (Orange)	Seed Yield (Petersburg)
All in Fall	2132 b	2471 a
All in Spring	2353 a	2004 a
Half and half	2130 b	2109 a

* Means followed by similar letters are not different according to Duncan's Multiple Range Test at 5 % level.

Results and Discussion

The present studies indicated that canola needs approximately 100 pounds of N per acre in central Virginia where predominant soils are sandy loam. One year's results from Orange location (Clay soils) were surprising given that all previous studies have indicated that 100 pounds of N per acre is sufficient when canola is grown on clay soils.

The results indicated that time of N fertilization in Central Virginia (Sandy loam soils) does not affect canola yield. Once again, one year's results from Orange location (Clay soils) were surprising given that all previous studies have indicated that N application time does not affect seed yield when canola is grown on clay soils. Despite these results, it may still be advisable to apply all N in fall because of expected difficulty of getting into wet clay soils in the spring.

We recommend split application in areas where N could be washed into surface water. Otherwise, a producer can apply N at a convenient time either at planting in the fall or at "Greening" in the spring.



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Experiment - 2

Plant Material : 264 canola breeding lines (F₃ and F₄)
Locations : Petersburg
Design : Augmented design
Season : 2005-06

Procedures

This experiment was conducted to compare agronomic performance of available breeding lines. In addition, whole-seed composition was determined. The N content of seeds was used to estimate N needs of canola.

Results and Discussion

Mean N content of whole seeds : 3.40 percent
Range of N contents : 2.26 percent
Minimum N content of whole seeds : 2.17 percent
Maximum N content of whole seeds : 4.43 percent

Estimation of canola yields (Pounds/acre) - Petersburg, Virginia (Five best yielding lines)

National Variety Trial 2005-06 : 1946, 1979, 1857, 1708, and 1672 (Mean=1812)
National Variety Trial 2006-07 : 2746, 2429, 2205, 2103, and 1976 (Mean=2292)
National Variety Trial 2007-08 : 2749, 1609, 1581, 1560, and 1533 (Mean=1806)
National Variety Trial 2008-00 : 3923, 3824, 3485, 3265, and 3247 (Mean=3549)
National Variety Trial 2009-10 : 3209, 2965, 2872, 2798, and 2610 (Mean=2890)

Yield of VIRGINIA cultivar over the last five years : 1879, 2103, 1510, 3187, and 2332 (Mean=2202)

Based on the average yield of five best lines during last five years in the NVT and the mean yield of VIRGINIA cultivar over the last five years, it can be assumed that average canola yield in Virginia varies from 2202 to 2470 (Average of 2336 pounds per acre) pounds per acre but could be as high as 3187 for VIRGINIA cultivar.

Based on the average N content in whole canola seed of 3.4 percent, canola needs 79 (For 2236 pounds of seed) to 108 (for 3187 pounds of seed) pounds N per acre. This estimate does not include N content in non-seed plant material. However, our previous research related to canola greens indicated that average dry matter yield of pre-flowering canola was approximately 2500 pounds per acre with an N content of 5 percent. It is not known how much of this N will be translocated to the seed, therefore, content of N in canola stover is unknown.

Considering that most soils will have some residual N, we suggest that N needs of canola in Virginia are around 100 pounds per acre.

Based on the results of these studies and previous research, conducted in Virginia over several years and location, we suggest that N needs of canola in Virginia are approximately 100 pounds per acre.